

The Utility Use Case #3

Customer (residential and commercial) implements Demand Response system and responds to Demand Response signals from the utility (using AMI)

Date 12-15-2009, Version 1.11

1 Descriptions of Function

1.1 Function Name

Customer implements Demand Response system and responds to Demand Response signals from the utility.

1.2 Function ID

L-11.1.3

1.3 Brief Description

This use case will describe the process to allow a Utility's Customer to implement a Demand Response system and respond to the Demand Response signals from the utility.

Scenario 1 - Utility, responding to a variety of drivers (eg. CO2, feeder loading, etc.), sends dynamic pricing signals to influence a customer's response. (Peak Shaving).

Scenario 2 - Utility, responding to a variety of drivers (eg. CO2, feeder loading, etc.), sends Demand Response signals to request a customer's response or disconnect service. (Reliability Driven).

1.4 Narrative

The Customer is becoming aware of the importance of understanding how much energy they are using and when it is being used. Many customers want to understand how their energy consumption habits affect their monthly energy bills and to find ways to reduce their monthly energy costs. By providing the Customer better visibility to their energy usage and cost at their site, they can make more educated energy related decisions regarding participation in load reduction programs, be more inclined to install energy efficient systems and potentially change their energy consumption habits. The Customer will be able to view more detailed energy use information based on daily and potentially near real time meter read.

With a utility AMI infrastructure, there are multiple avenues for the utility to provide information on energy use as well as alerts and updates as well as control signals. Technologies such as in home Customer displays, the Internet, cell phones, e-mail, and text messaging can be used to alert the Customer based on their desire for information and comfort level for taking action with that information. The types of messages the utility could send include energy conservation alerts or tips, planned outage information, pricing information, and other energy related information.

The information can also be used by in home automation or commercial/industrial building automation to make decisions based on Customer preference and take action based on control system programming. At the residential level, this may allow the Customer to benefit by shifting or reducing energy usage autonomously, making for a more consistent and convenient savings. Within the commercial and industrial space, building controls interacting with modern control systems can be used to alter consumption, store energy.

The Utility's Rates & Tariffs determines dynamic retail price and sends updates to the Customer. Customer responds. AMI system measures Customer response providing data to the Meter Data Management System.

The Meter Data Management System sends the updated pricing information or the demand response requirements necessary based on the system event through the meter communications network to the Customer AMI Meter. The Customer Building Automation System (commercial/industrial) or Home Area Network receives dynamic pricing or demand response system event signal from the Utility and performs optimizations on the best mix of actions to be taken based on the customer's criteria. The Home Area Network or commercial Building Control System acknowledges receipt of signal and verifies if action (demand response - load control) has taken place to the Meter Data Management System. The Meter Data Management System passes the responses back to the Customer Service/Billing System, compiling them and feeding them back to Distribution Operations.

Scenario 1 – sending dynamic pricing signals

Utility, responding to a variety of drivers (eg. CO₂, feeder loading, etc.), sends dynamic pricing signals to influence a customer's response.

Scenario 2 – sending dynamic pricing signals – reliability driven

Utility, responding to a variety of drivers (eg. CO₂, feeder loading, etc.), sends Demand Response signals to request a customer's response or disconnect service. (Reliability Driven).

The Utility's Rates & Tariffs determines dynamic retail price and sends updates to the Customer. Customer responds. AMI system measures Customer response providing data to the Meter Data Management System.

The Meter Data Management System sends the updated pricing information or the demand response requirements necessary based on the system event through the meter communications network to the Customer AMI Meter. The Customer Building Automation System (commercial/industrial) or Home Area Network receives dynamic pricing or demand response system event signal from the Utility and performs optimizations on the best mix of actions to be taken based on the customer's criteria. The Home Area Network or commercial Building Control System acknowledges receipt of signal and verifies if action (demand response - load control) has taken place to the Meter Data Management System. The Meter Data Management System passes the responses back to the Customer Service/Billing System, compiling them and feeding them back to Distribution Operations.

1.5 Actor (Stakeholder) Roles

Describe all the people (their job), systems, databases, organizations, and devices involved in or affected by the Function (e.g. operators, system administrators, technicians, end users, service personnel, executives, SCADA system, real-time database, RTO, RTU, IED, power system). Typically, these actors are logically grouped by organization or functional boundaries or just for collaboration purpose of this use case. We need to identify these groupings and their relevant roles and understand the constituency. The same actor could play different roles in different Functions, but only one role in one Function. If the same actor (e.g. the same person) does play multiple roles in one Function, list these different actor-roles as separate rows.

<i>Grouping (Community)'</i>		<i>Group Description</i>
<i>Actors Functioning from Customer's Premises.</i>		<i>Actors that perform their specific functions from the customer's premises.</i>
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
Home Area Network	System	HAN. Any Customer side (to include commercial and residential customers) automation that can make use of utility signals to affect energy usage within the premises will be considered as the Home Area Network for this project. Home Area Network can affect DER, lighting, security, etc. The Utility will not own Home Area Network.

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Customer Energy Management System	System	CEMS. Customer owned premise system which interfaces with the Home Area Network and the AMI Premise Interface to provide services for load management and distributed generation. Additionally, may provide the Customer ability to control Customer owned equipment independent of the AMI.
Customer	Person	Residential or commercial energy user that has a contract with the utility to receive electrical service from the utility and have an AMI meter installed. The Customer participates in programs provided by the utility including pricing events, load control or distributed generation. Receives pricing and event information from the AMI. Pre-programs responses to events into their load controllers). Needs to reduce their load throughout the event to reduce energy costs or receive financial benefit.
AMI Renewable Energy Credit Meter	Device	AMI REC Meter. AMI Renewable Energy Credit Meter is a revenue grade meter used to measure the energy supplied by Customer owned Distributed Generation. The AMI Renewable Energy Credit Meter information is recorded and forwarded to the PV Program Manager. Advanced electric revenue meter capable of two-way communications with the utility. A device that serves as a gateway between the utility, Customer site, and load controllers of the Customer. The meter measures, records, displays, and transmits data such as energy usage, generation, text messages, event logs, etc. to authorized systems (i.e., the AMI Network Management System) and provides other advanced utility functions.
Customer Control Equipment	Device	Switches loads on or off or reduces load in response to events communicated by the AMI system (Meter). Needs to follow the preprogrammed rules. E.g. smart thermostat.

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<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
(residential)		
Customer Display Device	Device	Display device that receives energy and event information from the AMI and presents it to the Customer.
AMI Net/Billing Meter	Device	AMI Net/Billing Meter is a bi-directional revenue grade meter used to measure energy supplied by the Distributed Generation or used by the Customer. Advanced electric revenue meter capable of two-way communications with the utility. A device that serves as a gateway between the utility, Customer site, and load controllers of the Customer. The meter measures, records, displays, and transmits data such as energy usage, generation, text messages, event logs, etc. to authorized systems (i.e., the AMI Network Management System) and provides other advanced utility functions.
AMI Meter	Device	Advanced electric revenue meter capable of two-way communications with the utility. A device that serves as a gateway between the utility, Customer site, and Customer load controllers. The meter measures, records, displays, and transmits data such as energy usage, generation, text messages, event logs, etc. to authorized systems (i.e., the AMI Network Management System) and provides other advanced utility functions.
AMI Premise Interface	System	The AMI Premise Interface is one of the communications radios that could be "under glass" of the AMI Meter. (There are two radios built in to the AMI Meter. One is for the AMI System and is a longer range radio. The other is for the AMI Premise Interface and it has a smaller range.) This is the communication resource to the Inverter and the Home Area Network (if available).

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<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
Customer Inverter	Device	Equipment at the Customer site belonging to the Customer that can be used for control of DG real and reactive power output.
Customer Predefined Profile	System	The Customer completes a profile upon installation that will determine how the Customer premise will function under different circumstances (pricing, etc.). This profile is programmed into the Customer Energy Management System.

Replicate this table for each logic group.

<i>Grouping (Community)'</i>		<i>Group Description</i>
<i>The Utility Actors.</i>		<i>Actors that perform their specific functions as a part of the Utility.</i>
<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
The Utility	System	Host utility.
Meter Data Management System	System	MDMS. System that gathers, validates, estimates and permits editing of meter data such as energy usage, generation, and meter logs. It stores this data for a limited amount of time before it goes to a data warehouse (Meter Data Archive), and makes this data available to authorized systems and authorized personnel.
Distributed Resource Availability and Control System	System	DRAACS. System and subsystems responsible for maintaining an estimate, with a known precision, of how much resource is available for dispatch. Distributed Resource Availability and Control System is also responsible for accepting requests for blocks of energy and/or capacity and implementing that request by issuing load control requests. Distributed Resource

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		Availability and Control System contains an optimization function that can determine the optimal Customer set to request curtailment from based upon a variety of factors/parameters, including the size and location of the desired Demand Response (DR) resource. Distributed Resource Availability and Control System is expected to track the "as implemented" response to load control requests and issue additional load reduction requests to selected Customer sets until authorized load reduction target is met. Distributed Resource Availability and Control System uses measured responses to load demand requests to refine its internal model. Note: Any Distributed Resource Availability and Control System in use today may be parts of other systems being used. No platform exists to bring it into an operational tool today.
Grid Control Center	System	GCC. The Grid Control Center controls grid operations through the Energy Management System, SCADA and Distribution Management System in the control area. The Grid Control Center will communicate to grid operators to ensure grid reliability and also sends signals.
Customer Information System	System	CIS. Maintains Customer contact information, calculates and formats Customer bills, receives, and applies payments for individual accounts. The system is responsible for storing Customer information such as site data, meter number, rates, and program participation.
Customer Service Representative	Person	CSR. Staff employed by the utility who respond to Customer complaints, to outage notifications, or to Customer requests to activate, modify and/or terminate delivery of service. Customer Service Representatives also enroll a Customer in utility sponsored programs and answer questions related to the energy consumption and cost data of the Customer. Many off-cycle reading,

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		billing, work orders and diagnostics requests are initiated by the Customer Service Representative in response to Customer contact.
AMI Network Management System	System	AMI NMS. AMI Network Management System is the utility back office system that is responsible for remote two-way communications with the AMI Meters to retrieve data and execute commands. The AMI Network Management System has the responsibility to balance load on the communications network resulting from scheduled meter reads and to retry meters when communications fail. AMI Network Management System is the component responsible for monitoring the health of the AMI system, managing and implementing remote firmware updates, configuration changes, provisioning functions, control and diagnostics.
Distribution Management System	System	DMS. A system that integrates the functions of SCADA, outage management, work management, distribution load management, reactive control, and asset management into a single console and set of applications.
AMI	System	Advanced Metering Infrastructure. Advanced electric revenue metering system capable of two-way communications between the Customer and the utility. A device that serves as a gateway (AMI Premise Interface) between the utility, Customer site, and load controllers of the Customer. The meter measures, records, displays, and transmits data such as energy usage, generation, text messages, event logs, etc. to authorized systems (i.e., the AMI Network Management System) and provides other advanced utility functions..
Wholesale Power Group	Person	WPG. Takes all resources available and determines optimum generation mix on economic basis

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<i>Actor Name</i>	<i>Actor Type (person, device, system etc.)</i>	<i>Actor Description</i>
Power Operations	Person	PO. Initiates dynamic pricing data or demand response events to mitigate transmission reliability requirements
Distribution Operations	Person	DO. Operating over the distribution system, using SCADA and Distribution Management System to make decisions concerning the distribution grid. Initiates dynamic pricing data or demand response events to mitigate distribution reliability and voltage profile requirements.
Price Origination Group	System	Develop the rules that translate the resource costs and reliability inputs into dynamic pricing and demand response signals for the Customer
Energy Management System	System	EMS. The Energy Management System controls grid operations in the control area. The Energy Management System will communicate to substation RTUs to ensure grid reliability.

1.6 Information exchanged

Describe any information exchanged in this template.

<i>Information Object Name</i>	<i>Information Object Description</i>
Wholesale Power Group loading and additional pricing information	System loading information and additional information that may affect the pricing signal.

<i>Information Object Name</i>	<i>Information Object Description</i>
Distribution Management System loading and additional pricing information	System loading information and additional information that may affect the pricing signal.
Wholesale Power Group and Distribution Management System loading and additional pricing information	A combination of the system loading information and additional information that may affect the pricing signal sent from the Wholesale Power Group and the Distribution Management System.
Current Dynamic Pricing Signal	Pricing Signal calculated when the Price Origination Group enters the loading and additional pricing information into the Dynamic Pricing Signal Application.
Current Dynamic Pricing Signal and the Customer Predefined Profile	Calculated pricing signal from the Dynamic Pricing Signal Application that is compared to the Customer Predefined Profile. This comparison is made automatically and will determine how the Customer Energy Management System and the affected premises (controlled premise devices) will respond.
AMI Net/Billing Meter Read Request	A request for an AMI Net/Billing Meter Read.
AMI Net/Billing Meter Data	Meter data for a specific AMI Net/Billing Meter. This data includes voltage, current, load and power quality parameters.
Updated System and System Condition Data	Updated field equipment status, system or area load, voltage parameters, power quality and outages.
Demand Response Event Based on Reliability	Demand Response Event called to maintain system reliability.
Demand Response Selected Customer Listing for the Demand Response Event Notification	Selected set of customers chosen to meet the requirements of the Demand Response Event.
Compares the Demand Response Selected Customer Listing for the	The Customers selected to meet the requirements of the Demand Response Event will have the event parameters compared to their Customer Predefined Profile. This comparison is made automatically

<i>Information Object Name</i>	<i>Information Object Description</i>
Demand Response Event Notification with the Customer Predefined Profile	and will determine how the Customer Energy Management System and the affected premises (controlled premise devices) will respond.
Acknowledgement of Demand Response Event Notification	The Customer will be sent a notification of the Demand Response Event on the Customer Display. The Customer can acknowledge that event by pushing the Acknowledge Button on the Customer Display. <u>The Customer isn't required to acknowledge the event.</u>
Demand Response Override Function	When the Customer chooses to "Override" a selected Demand Response Event, they will be required to acknowledge the event on their Customer Display by pushing the "Acknowledge" button and entering the correct "Override Code" onto the Customer Display. When the Customer Display receives the correct "Override Code" it will send a "Demand Response Override Function" to the Customer Energy Management System, which will allow the controlled premise devices to act accordingly.
Demand Response Override Command	After a Customer chooses to "Override" a specific Demand Response Event, the Customer Energy Management System receives a "Demand Response Override Function" from the Customer Display. The Customer Energy Management System reads this "Demand Response Override Function" and sends out a "Demand Response Override Command" to the controlled devices in the premise. The controlled devices will receive the "Demand Response Override Command" and respond accordingly.
Override Acknowledgement	The "Override Acknowledgement" is developed when the Customer Energy Management System receives verification from the controlled devices in the premise that they have responded accordingly to the "Demand Response Override Command". The Customer Energy Management System sends the "Override Acknowledgement" signal back to the Distributed Resource Availability and Control System and the Meter Data Management System to allow the system to know which Customers decided to "Override" the Demand Response Event and to allow for the system to verify if enough load was affected to meet the needs of the Demand Response Event.
Equipment Status Notification	During normal operation (not during "Override") the Customer Energy Management System will send an "Equipment Status Notification" to the Distributed Resource Availability and Control System and the Meter Data Management System to allow the system to know which Customers responded the Demand Response Event and to allow for the system to verify if enough load was

<i>Information Object Name</i>	<i>Information Object Description</i>
	affected to meet the needs of the Demand Response Event.
Total Load Affected by the Demand Response Event	The calculated total load that was affected by the Demand Response Event. This affected load is calculated by the Meter Data Management System from the “before Demand Response Event” and “after Demand Response Event” metering data.

1.7 Activities/Services

Describe or list the activities and services involved in this Function (in the context of this Function). An activity or service can be provided by a computer system, a set of applications, or manual procedures. These activities/services should be described at an appropriate level, with the understanding that sub-activities and services should be described if they are important for operational issues, automation needs, and implementation reasons. Other sub-activities/services could be left for later analysis.

<i>Activity/Service Name</i>	<i>Activities/Services Provided</i>

1.8 Contracts/Regulations

Identify any overall (human-initiated) contracts, regulations, policies, financial considerations, engineering constraints, pollution constraints, and other environmental quality issues that affect the design and requirements of the Function.

<i>Contract/Regulation</i>	<i>Impact of Contract/Regulation on Function</i>
Customer DG Service Contract	No Customer can operate on the Utility’s system in a manner that is detrimental to the Utility or other Customer.
Customer Pricing Contract	The Customer has signed a Customer Pricing Contract to allow them to adjust their loads and/or DG source with pricing.
Customer	The Customer has completed a Predefined Profile for the normal use of their DG installation. This profile has been programmed into the Customer Energy Management System. The Customer Energy Management System will function automatically based on this profile.

<i>Policy</i>	<i>From Actor</i>	<i>May</i>	<i>Shall Not</i>	<i>Shall</i>	<i>Description (verb)</i>	<i>To Actor</i>

<i>Constraint</i>	<i>Type</i>	<i>Description</i>	<i>Applies to</i>

2 Step by Step Analysis of Function

2.1 Steps to implement function – Scenario 1 – sending dynamic pricing signals

Scenario 1 – sending dynamic pricing signals

2.1.1 Preconditions and Assumptions

Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities

Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place

Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be 'filled in but unapproved'.

<i>Actor/System/Information/Contract</i>	<i>Preconditions or Assumptions</i>
Customer	The Customer has enrolled in dynamic pricing tariff
Customer	Customer has enrolled in utility demand response program (alternate scenario)

<i>Actor/System/Information/Contract</i>	<i>Preconditions or Assumptions</i>
Customer	Customer has selected a method for Pricing/Demand Response event notification signals
The Utility	Wholesale Power Group gets system load feedback via the Distribution Management System
The Utility	AMI system is installed
Customer	The Customer has completed a Predefined Profile for the normal use of their DG installation. This profile has been programmed into the Customer Energy Management System. The Customer Energy Management System will function automatically based on this profile.

2.1.2 Steps

Describe the normal sequence of events, focusing on steps that identify new types of information or new information exchanges or new interface issues to address. Should the sequence require detailed steps that are also used by other functions, consider creating a new “sub” function, then referring to that “subroutine” in this function. Remember that the focus should be less on the algorithms of the applications and more on the interactions and information flows between “entities”, e.g. people, systems, applications, data bases, etc. There should be a direct link between the narrative and these steps.

The numbering of the sequence steps conveys the order and concurrency and iteration of the steps occur. Using a Dewey Decimal scheme, each level of nested procedure call is separated by a dot ‘.’. Within a level, the sequence number comprises an optional letter and an integer number. The letter specifies a concurrent sequence within the next higher level; all letter sequences are concurrent with other letter sequences. The number specifies the sequencing of messages in a given letter sequence. The absence of a letter is treated as a default ‘main sequence’ in parallel with the lettered sequences.

Sequence 1:

- 1.1 - Do step 1*
- 1.2A.1 - In parallel to activity 2 B do step 1*
- 1.2A.2 - In parallel to activity 2 B do step 2*
- 1.2B.1 - In parallel to activity 2 A do step 1*
- 1.2B.2 - In parallel to activity 2 A do step 2*
- 1.3 - Do step 3*
- 1.3.1 - nested step 3.1*

1.3.2 - nested step 3.2

Sequence 2:

2.1 - Do step 1

2.2 - Do step 2

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
#	<i>Triggering event? Identify the name of the event</i>	<i>What other actors are primarily responsible for the Process/Activity? Actors are defined in section 1.5.</i>	<i>Label that would appear in a process diagram. Use action verbs when naming activity.</i>	<i>Describe the actions that take place in active and present tense. The step should be a descriptive noun/verb phrase that portrays an outline summary of the step. "If ...Then...Else" scenarios can be captured as multiple Actions or as separate steps.</i>	<i>What other actors are primarily responsible for Producing the information? Actors are defined in section 1.5.</i>	<i>What other actors are primarily responsible for Receiving the information? Actors are defined in section 1.5. (Note – May leave blank if same as Primary Actor)</i>	<i>Name of the information object. Information objects are defined in section 1.6</i>	<i>Elaborate architectural issues using attached spreadsheet. Use this column to elaborate details that aren't captured in the spreadsheet.</i>	<i>Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.</i>
1.1	The Utility, after viewing the current system metering data, decides to send out an economic signal to reduce utility peaking requirements.	Wholesale Power Group	Wholesale Power Group sends pricing information to the Price Origination Group.	The Wholesale Power Group sends loading and additional pricing information to the Price Origination Group.	Wholesale Power Group	Price Origination Group	Wholesale Power Group loading and additional pricing information		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.1.1	The Utility, after viewing the current system metering data, decides to send out an economic signal to encourage the Customer to react in a certain way.	Distribution Management System	Distribution Management System sends pricing information to the Price Origination Group	The Distribution Management System sends loading and additional pricing information to the Price Origination Group.	Distribution Management System	Price Origination Group	Distribution Management System loading and additional pricing information		
1.1.2	The Price Origination Group enters information into the Dynamic Pricing Signal Application	Price Origination Group	The Price Origination Group enters information into the Dynamic Pricing Signal Application.	The Price Origination Group enters the loading and additional pricing information into the Dynamic Pricing Signal Application.	Price Origination Group	Dynamic Pricing Signal Application	Wholesale Power Group and Distribution Management System loading and additional pricing information		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.2	The Dynamic Pricing Signal Application calculates the Current Dynamic Pricing Signal.	Dynamic Pricing Signal Application	The Dynamic Pricing Signal Application calculates the Current Dynamic Pricing Signal.	The Dynamic Pricing Signal Application calculates the Current Dynamic Pricing Signal.	Dynamic Pricing Signal Application	Dynamic Pricing Signal Application	Current Dynamic Pricing Signal		
1.2.1A	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the Price Origination Group.	Dynamic Pricing Signal Application	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the Price Origination Group.	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the Price Origination Group.	Dynamic Pricing Signal Application	Price Origination Group	Current Dynamic Pricing Signal		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.2.1B	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the Meter Data Management System.	Dynamic Pricing Signal Application	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the Meter Data Management System.	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the Meter Data Management System	Dynamic Pricing Signal Application	Meter Data Management System	Current Dynamic Pricing Signal		
1.2.1C	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the Customer Information System.	Dynamic Pricing Signal Application	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the Customer Information System.	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the Customer Information System.	Dynamic Pricing Signal Application	Customer Information System	Current Dynamic Pricing Signal		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.2.1D	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the AMI Network Management System.	Dynamic Pricing Signal Application	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the AMI Network Management System.	The Dynamic Pricing Signal Application delivers the Current Dynamic Pricing Signal to the AMI Network Management System.	Dynamic Pricing Signal Application	AMI Network Management System	Current Dynamic Pricing Signal		
1.2.1D.1	The AMI Network Management System delivers the Current Dynamic Pricing Signal to the AMI Premise Interface.	AMI Network Management System	The AMI Network Management System delivers the Current Dynamic Pricing Signal to the AMI Premise Interface.	The AMI Network Management System delivers the Current Dynamic Pricing Signal to the AMI Premise Interface via the AMI Infrastructure.	AMI Network Management System	AMI Premise Interface	Current Dynamic Pricing Signal		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.2.1D.2	The AMI Premise Interface delivers the Current Dynamic Pricing Signal to the Customer Display.	AMI Premise Interface	The AMI Premise Interface delivers the Current Dynamic Pricing Signal to the Customer Display.	The AMI Premise Interface sends the Current Dynamic Pricing Signal to the Customer Display.	AMI Premise Interface	Customer Display Device	Current Dynamic Pricing Signal		
1.2.1D.3	The AMI Premise Interface delivers the Current Dynamic Pricing Signal to the Customer Energy Management System.	AMI Premise Interface	The AMI Premise Interface delivers the Current Dynamic Pricing Signal to the Customer Energy Management System.	The AMI Premise Interface sends the Current Dynamic Pricing Signal to the Customer Energy Management System.	AMI Premise Interface	Customer Energy Management System	Current Dynamic Pricing Signal		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.2.1D.4	The Customer Energy Management System compares and acts accordingly.	Customer Energy Management System	The Customer Energy Management System compares and acts accordingly.	The Customer Energy Management System compares the Current Dynamic Pricing Signal to the Customer Predefined Profile and acts accordingly	Dynamic Pricing Signal Application	Customer Energy Management System	Current Dynamic Pricing Signal and the Customer Predefined Profile		
1.3	The Meter Data Management System sends an AMI Net/Billing Meter Read Request to the AMI Network Management System.	Meter Data Management System	The Meter Data Management System sends an AMI Net/Billing Meter Read Request to the AMI Network Management System.	The Meter Data Management System sends an AMI Net/Billing Meter Read Request to the AMI Network Management System.	Meter Data Management System	AMI Network Management System	AMI Net/Billing Meter Read Request		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.3.1	The AMI Network Management System sends an AMI Net/Billing Meter Read Request to the AMI Net/Billing Meter.	AMI Network Management System	The AMI Network Management System sends an AMI Net/Billing Meter Read Request to the AMI Net/Billing Meter.	The AMI Network Management System sends an AMI Net/Billing Meter Read Request to the AMI Net/Billing Meter via the AMI Infrastructure.	AMI Network Management System	AMI Net/Billing Meter	AMI Net/Billing Meter Read Request		
1.3.2	The AMI Net/Billing Meter delivers meter readings.	AMI Net/Billing Meter	The AMI Net/Billing Meter delivers meter readings.	The AMI Net/Billing Meter delivers meter readings to the AMI Network Management System via the AMI Infrastructure.	AMI Net/Billing Meter	AMI Network Management System	AMI Net/Billing Meter Data		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
1.3.3	The AMI Network Management System delivers meter readings to the Meter Data Management System.	AMI Network Management System	The AMI Network Management System delivers meter readings to the Meter Data Management System.	The AMI Network Management System sends the AMI Net/Billing Meter readings to the Meter Data Management System.	AMI Network Management System	Meter Data Management System	AMI Net/Billing Meter Data		

2.1.3 Post-conditions and Significant Results

Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

Describe any significant results from the Function

<i>Actor/Activity</i>	<i>Post-conditions Description and Results</i>
Customer	Customer has researched their Predefined Profile settings and has programmed them into their Customer Energy Management System to allow their DG System act accordingly to benefit their costs/payback.
The Utility	The Utility can call an event and have the Customer respond accordingly.

2.2 Steps to implement function – Scenario 2 – sending dynamic pricing signals – reliability driven

Scenario 2 – sending dynamic pricing signals – reliability driven

2.2.1 Preconditions and Assumptions

Describe conditions that must exist prior to the initiation of the Function, such as prior state of the actors and activities

Identify any assumptions, such as what systems already exist, what contractual relations exist, and what configurations of systems are probably in place

Identify any initial states of information exchanged in the steps in the next section. For example, if a purchase order is exchanged in an activity, its precondition to the activity might be ‘filled in but unapproved’.

<i>Actor/System/Information/Contract</i>	<i>Preconditions or Assumptions</i>
The Utility	The Customer has enrolled in dynamic pricing tariff
The Utility	Customer has enrolled in utility demand response program (alternate scenario)
The Utility	Customer has selected a method for pricing/Demand Response event notification signals
The Utility	Wholesale Power Group gets system load feedback via the Distribution Management System
The Utility	AMI system is installed
Customer	The Customer has completed a Predefined Profile for the normal use of their DG installation. This profile has been programmed into the Customer Energy Management System. The Customer Energy Management System will function automatically based on this profile.
Customer	The Customer has the ability to Override a Demand Response Event, but it may affect the rate at which they are billed.

2.2.2 Steps

Describe the normal sequence of events, focusing on steps that identify new types of information or new information exchanges or new interface issues to address. Should the sequence require detailed steps that are also used by other functions, consider creating a new “sub” function, then referring to that “subroutine” in this function. Remember that the focus should be less on the algorithms of the applications and more on the

interactions and information flows between “entities”, e.g. people, systems, applications, data bases, etc. There should be a direct link between the narrative and these steps.

The numbering of the sequence steps conveys the order and concurrency and iteration of the steps occur. Using a Dewey Decimal scheme, each level of nested procedure call is separated by a dot ‘.’. Within a level, the sequence number comprises an optional letter and an integer number. The letter specifies a concurrent sequence within the next higher level; all letter sequences are concurrent with other letter sequences. The number specifies the sequencing of messages in a given letter sequence. The absence of a letter is treated as a default ‘main sequence’ in parallel with the lettered sequences.

Sequence 1:

- 1.1 - Do step 1
- 1.2A.1 - In parallel to activity 2 B do step 1
- 1.2A.2 - In parallel to activity 2 B do step 2
- 1.2B.1 - In parallel to activity 2 A do step 1
- 1.2B.2 - In parallel to activity 2 A do step 2
- 1.3 - Do step 3
- 1.3.1 - nested step 3.1
- 1.3.2 - nested step 3.2

Sequence 2:

- 2.1 - Do step 1
- 2.2 - Do step 2

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
#	Triggering event? Identify the name of the event	What other actors are primarily responsible for the Process/Activity? Actors are defined in section 1.5.	Label that would appear in a process diagram. Use action verbs when naming activity.	Describe the actions that take place in active and present tense. The step should be a descriptive noun/verb phrase that portrays an outline summary of the step. “If ...Then...Else” scenarios can be captured as multiple Actions or as separate steps.	What other actors are primarily responsible for Producing the information? Actors are defined in section 1.5.	What other actors are primarily responsible for Receiving the information? Actors are defined in section 1.5. (Note – May leave blank if same as Primary Actor)	Name of the information object. Information objects are defined in section 1.6	Elaborate architectural issues using attached spreadsheet. Use this column to elaborate details that aren’t captured in the spreadsheet.	Reference the applicable IECSA Environment containing this data exchange. Only one environment per step.

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.1	The Utility decides, because of reliability concerns, to issue a Demand Response Event Notification.	Distribution Management System	Distribution Management System sends system condition data to the Distribution Operations.	Distribution Management System updates system data and sends the system condition data to the Distribution Operations.	Distribution Management System	Distribution Operations	Updated System and System Condition Data		
2.1.1	The Utility decides, because of reliability concerns, to issue a Demand Response Event Notification.	Distribution Operations	Distribution Operations review the system condition data.	Distribution Operations review the system condition data and determine that a Demand Response event is required for system reliability.	Distribution Management System	Distribution Operations	Updated System and System Condition Data		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.1.2	The Distribution Operations communicate the possible need for a Demand Response Event.	Distribution Operations	The Distribution Operations communicate the possible need for a Demand Response Event.	The Distribution Operations communicate the possible need for a Demand Response Event based on reliability to the Wholesale Power Group.	Distribution Operations	Wholesale Power Group	Demand Response Event Based on Reliability		
2.1.3	The Distribution Management System sends data to the Wholesale Power Group.	Distribution Management System	The Distribution Management System sends data to the Wholesale Power Group.	The Distribution Management System sends Updated System and System Condition Data to the Wholesale Power Group.	Distribution Management System	Wholesale Power Group	Updated System and System Condition Data		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.2	The Wholesale Power Group determines that a Demand Response Event is necessary based on reliability.	Wholesale Power Group	The Wholesale Power Group determines that a Demand Response Event is necessary based on reliability.	The Wholesale Power Group determines that a Demand Response Event is necessary based on reliability or other economic requirements.	Wholesale Power Group	Wholesale Power Group	Demand Response Event Based on Reliability		
2.2.1	The Wholesale Power Group sends the Demand Response Event Notification to the Distributed Resource Availability and Control System.	Wholesale Power Group	The Wholesale Power Group sends the Demand Response Event Notification to the Distributed Resource Availability and Control System.	Wholesale Power Group sends the Demand Response Event Notification to the Distributed Resource Availability and Control System. The Demand Response Event Notification will include current system load, affected area and reduction amount.	Wholesale Power Group	Distributed Resource Availability and Control System	Demand Response Event Based on Reliability	The Demand Response Event Notification will include current system load, affected area and reduction amount.	

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.2.2	Distributed Resource Availability and Control System assembles the Demand Response Selected Customer Listing for the Demand Response Event Notification.	Distributed Resource Availability and Control System	Distributed Resource Availability and Control System assembles the Demand Response Selected Customer Listing for the Demand Response Event Notification.	Distributed Resource Availability and Control System assembles the Demand Response Selected Customer Listing to meet the needs of the Demand Response Event Notification. This notification will <u>only</u> be sent out to the selected customers.	Distributed Resource Availability and Control System	Distributed Resource Availability and Control System	Demand Response Selected Customer Listing for the Demand Response Event Notification	This notification will <u>only</u> be sent out to the selected customers.	
2.3.1A	Distributed Resource Availability and Control System sends the Demand Response Event Notification to the Meter Data Management System.	Distributed Resource Availability and Control System	Distributed Resource Availability and Control System sends the Demand Response Event Notification to the Meter Data Management System.	Distributed Resource Availability and Control System sends the Demand Response Event Notification with the Selected Customer to the Meter Data Management System.	Distributed Resource Availability and Control System	Meter Data Management System	Demand Response Selected Customer Listing for the Demand Response Event Notification		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.3.1B	Distributed Resource Availability and Control System sends the Demand Response Event Notification to the Customer Information System.	Distributed Resource Availability and Control System	Distributed Resource Availability and Control System sends the Demand Response Event Notification to the Customer Information System.	The Distributed Resource Availability and Control System provides the Demand Response Event Notification with the Selected Customer to the Customer Information System.	Distributed Resource Availability and Control System	Customer Information System	Demand Response Selected Customer Listing for the Demand Response Event Notification		
2.3.1C	Distributed Resource Availability and Control System sends the Demand Response Event Notification to the AMI Network Management System.	Distributed Resource Availability and Control System	Distributed Resource Availability and Control System sends the Demand Response Event Notification to the AMI Network Management System.	The Distributed Resource Availability and Control System provides the Demand Response Event Notification with the Selected Customer to the AMI Network Management System.	Distributed Resource Availability and Control System	AMI Network Management System	Demand Response Selected Customer Listing for the Demand Response Event Notification		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.3.1C.1	AMI Network Management System sends the Demand Response Event Notification to the AMI Premise Interface.	AMI Network Management System	AMI Network Management System sends the Demand Response Event Notification to the AMI Premise Interface.	The AMI Network Management System sends Demand Response Event Notification with the Selected Customer out to the AMI Premise Interface via the AMI Infrastructure.	AMI Network Management System	AMI Premise Interface	Demand Response Selected Customer Listing for the Demand Response Event Notification		
2.3.1C.2A	AMI Premise Interface sends the Demand Response Event Notification to the Customer Energy Management System.	AMI Premise Interface	AMI Premise Interface sends the Demand Response Event Notification to the Customer Energy Management System.	The AMI Premise Interface delivers the Demand Response Event Notification with the Selected Customer to the selected customer's Customer Energy Management System.	AMI Premise Interface	Customer Energy Management System	Demand Response Selected Customer Listing for the Demand Response Event Notification		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.3.1C.2B	AMI Premise Interface sends the Demand Response Event Notification to the Customer Display.	AMI Premise Interface	AMI Premise Interface sends the Demand Response Event Notification to the Customer Display.	The AMI Premise Interface delivers the Demand Response Event Notification with the Selected Customer to the selected customer's Customer Display.	AMI Premise Interface	Customer Display Device	Demand Response Selected Customer Listing for the Demand Response Event Notification		
2.4	The Customer Energy Management System compares the Demand Response Event Notification to the Customer Predefined Profile.	Customer Energy Management System	The Customer Energy Management System compares the Demand Response Event Notification to the Customer Predefined Profile.	The Customer Energy Management System compares the Demand Response Event Notification with the Selected Customer to the Customer Predefined Profile and acts accordingly.	Distributed Resource Availability and Control System	Customer Energy Management System	Compares the Demand Response Selected Customer Listing for the Demand Response Event Notification with the Customer Predefined Profile		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.4.1A	The Customer acknowledges the Demand Response Event Notification.	Customer	The Customer acknowledges the Demand Response Event Notification.	The Customer acknowledges the Demand Response Event Notification on the Customer Display.	Customer	Customer Display Device	Acknowledgement of Demand Response Event Notification		
2.4.1A.1	The Customer chooses to opt out of the Demand Response Event.	Customer	The Customer chooses to opt out of the Demand Response Event.	The Customer chooses to opt out of the Demand Response Event by selecting the Demand Response Override Function on the Customer Display.	Customer	Customer Display Device	Demand Response Override Function		
2.4.1A.2	Demand Response Override Command is delivered to the AMI Premise Interface.	Customer Display Device	Demand Response Override Command is delivered to the AMI Premise Interface.	The Demand Response Override Command is delivered from the Customer Display to the AMI Premise Interface.	Customer Display Device	AMI Premise Interface	Demand Response Override Command		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.4.1A.3	The AMI Premise Interface delivers the Demand Response Override Command.	AMI Premise Interface	The AMI Premise Interface delivers the Demand Response Override Command.	The AMI Premise Interface delivers the Demand Response Override Command to the Customer Energy Management System.	AMI Premise Interface	Customer Energy Management System	Demand Response Override Command		
2.4.1A.4	Customer Energy Management System reacts accordingly to the Demand Response Override Command.	Customer Energy Management System	Customer Energy Management System reacts accordingly to the Demand Response Override Command.	The Customer Energy Management System reacts accordingly to the Demand Response Override Command.	Customer Display Device	Customer Energy Management System	Demand Response Override Command		
2.4.1A.5	The Customer Energy Management System sends Override Acknowledgment.	Customer Energy Management System	The Customer Energy Management System sends Override Acknowledgment.	The Customer Energy Management System sends Override Acknowledgment to the AMI Premise Interface.	Customer Energy Management System	AMI Premise Interface	Override Acknowledgment		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.4.1A.6	The AMI Premise Interface sends Override Acknowledgment.	AMI Premise Interface	The AMI Premise Interface sends Override Acknowledgment.	The AMI Premise Interface Delivers the Override Acknowledgment to the AMI Network Management System via the AMI Infrastructure.	AMI Premise Interface	AMI Network Management System	Override Acknowledgment		
2.4.1A.7	The AMI Network Management System sends Override Acknowledgment.	AMI Network Management System	The AMI Network Management System sends Override Acknowledgment.	The AMI Network Management System delivers the Override Acknowledgment to Distributed Resource Availability and Control System.	AMI Network Management System	Distributed Resource Availability and Control System	Override Acknowledgment		
2.4.1A.8	The AMI Network Management System delivers the Override Acknowledgment to the Meter Data Management System.	AMI Network Management System	The AMI Network Management System delivers the Override Acknowledgment to the Meter Data Management System.	The AMI Network Management System delivers the Override Acknowledgment to the Meter Data Management System.	AMI Network Management System	Meter Data Management System	Override Acknowledgment		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.4.1B	Customer Energy Management System sends an Equipment Status Notification.	Customer Energy Management System	Customer Energy Management System sends an Equipment Status Notification.	The Customer Energy Management System sends an Equipment Status Notification to the AMI Premise Interface	Customer Energy Management System	AMI Premise Interface	Equipment Status Notification		
2.4.1B.1	AMI Premise Interface sends an Equipment Status Notification.	AMI Premise Interface	AMI Premise Interface sends an Equipment Status Notification.	The AMI Premise Interface Delivers the Equipment Status Notification to the AMI Network Management System via the AMI Infrastructure.	AMI Premise Interface	AMI Network Management System	Equipment Status Notification		
2.4.1B.1	AMI Network Management System sends an Equipment Status Notification.	AMI Network Management System	AMI Network Management System sends an Equipment Status Notification.	The AMI Network Management System delivers the Equipment Status Notification to Distributed Resource Availability and Control System.	AMI Network Management System	Distributed Resource Availability and Control System	Equipment Status Notification		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.4.1B.2	AMI Network Management System delivers the Equipment Status Notification to the Meter Data Management System.	AMI Network Management System	AMI Network Management System delivers the Equipment Status Notification to the Meter Data Management System.	The AMI Network Management System delivers the Equipment Status Notification to the Meter Data Management System.	AMI Network Management System	Meter Data Management System	Equipment Status Notification		
2.5	Distributed Resource Availability and Control System sends an AMI Net/Billing Meter Read Request to the AMI Network Management System.	Distributed Resource Availability and Control System	Distributed Resource Availability and Control System sends an AMI Net/Billing Meter Read Request to the AMI Network Management System..	Distributed Resource Availability and Control System sends an AMI Net/Billing Meter Read Request to the AMI Network Management System.	Distributed Resource Availability and Control System	AMI Network Management System	AMI Net/Billing Meter Read Request		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.5.1	The AMI Network Management System sends the AMI Net/Billing Meter Read Request to the AMI Net/Billing Meter via the AMI Infrastructure.	AMI Network Management System	The AMI Network Management System sends the AMI Net/Billing Meter Read Request to the AMI Net/Billing Meter via the AMI Infrastructure.	The AMI Network Management System sends the AMI Net/Billing Meter Read Request to the AMI Net/Billing Meter via the AMI Infrastructure.	AMI Network Management System	AMI Net/Billing Meter	AMI Net/Billing Meter Read Request		
2.5.2	The AMI Net/Billing Meter delivers AMI Net/Billing Meter Data to the AMI Network Management System.	AMI Net/Billing Meter	The AMI Net/Billing Meter delivers AMI Net/Billing Meter Data to the AMI Network Management System.	The AMI Net/Billing Meter delivers AMI Net/Billing Meter Data to the AMI Network Management System via the AMI Infrastructure.	AMI Net/Billing Meter	AMI Network Management System	AMI Net/Billing Meter Data		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.5.3	The AMI Network Management System sends the AMI Net/Billing Meter Data to Distributed Resource Availability and Control System.	AMI Network Management System	The AMI Network Management System sends the AMI Net/Billing Meter Data to Distributed Resource Availability and Control System.	The AMI Network Management System sends the AMI Net/Billing Meter Data to Distributed Resource Availability and Control System.	AMI Network Management System	Distributed Resource Availability and Control System	AMI Net/Billing Meter Data		
2.5.4	The AMI Network Management System delivers the AMI Net/Billing Meter Data to the Meter Data Management System.	AMI Network Management System	The AMI Network Management System delivers the AMI Net/Billing Meter Data to the Meter Data Management System.	The AMI Network Management System delivers the AMI Net/Billing Meter Data to the Meter Data Management System.	AMI Network Management System	Meter Data Management System	AMI Net/Billing Meter Data		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.6	Meter Data Management System performs a calculation for the total load affected by the Demand Response Event.	Meter Data Management System	Meter Data Management System performs a calculation for the total load affected by the Demand Response Event.	Meter Data Management System performs a calculation and verification to calculate the total load affected by the Demand Response Event.	Meter Data Management System	Meter Data Management System	AMI Net/Billing Meter Data		
2.6.1	Meter Data Management System delivers the total load affected by the Demand Response Event to the Wholesale Power Group.	Meter Data Management System	Meter Data Management System delivers the total load affected by the Demand Response Event to the Wholesale Power Group.	Meter Data Management System delivers the total load affected by the Demand Response Event to the Wholesale Power Group.	Meter Data Management System	Wholesale Power Group	Total Load Affected by the Demand Response Event		

#	Event	Primary Actor	Name of Process/Activity	Description of Process/Activity	Information Producer	Information Receiver	Name of Info Exchanged	Additional Notes	IECSA Environments
2.6.2	Meter Data Management System delivers the total load affected by the Demand Response Event to the Distribution Management System.	Meter Data Management System	Meter Data Management System delivers the total load affected by the Demand Response Event to the Distribution Management System.	The Meter Data Management System delivers the total load affected by the Demand Response Event to the Distribution Management System.	Meter Data Management System	Distribution Management System	Total Load Affected by the Demand Response Event		
2.6.3	Distribution Management System delivers the total load affected by the Demand Response Event to the Distribution Operations.	Distribution Management System	Distribution Management System delivers the total load affected by the Demand Response Event to the Distribution Operations.	The Distribution Management System displays the total load affected by the Demand Response Event to the Distribution Operations.	Distribution Management System	Distribution Operations	Total Load Affected by the Demand Response Event		

2.2.3 Post-conditions and Significant Results

Describe conditions that must exist at the conclusion of the Function. Identify significant items similar to that in the preconditions section.

Describe any significant results from the Function

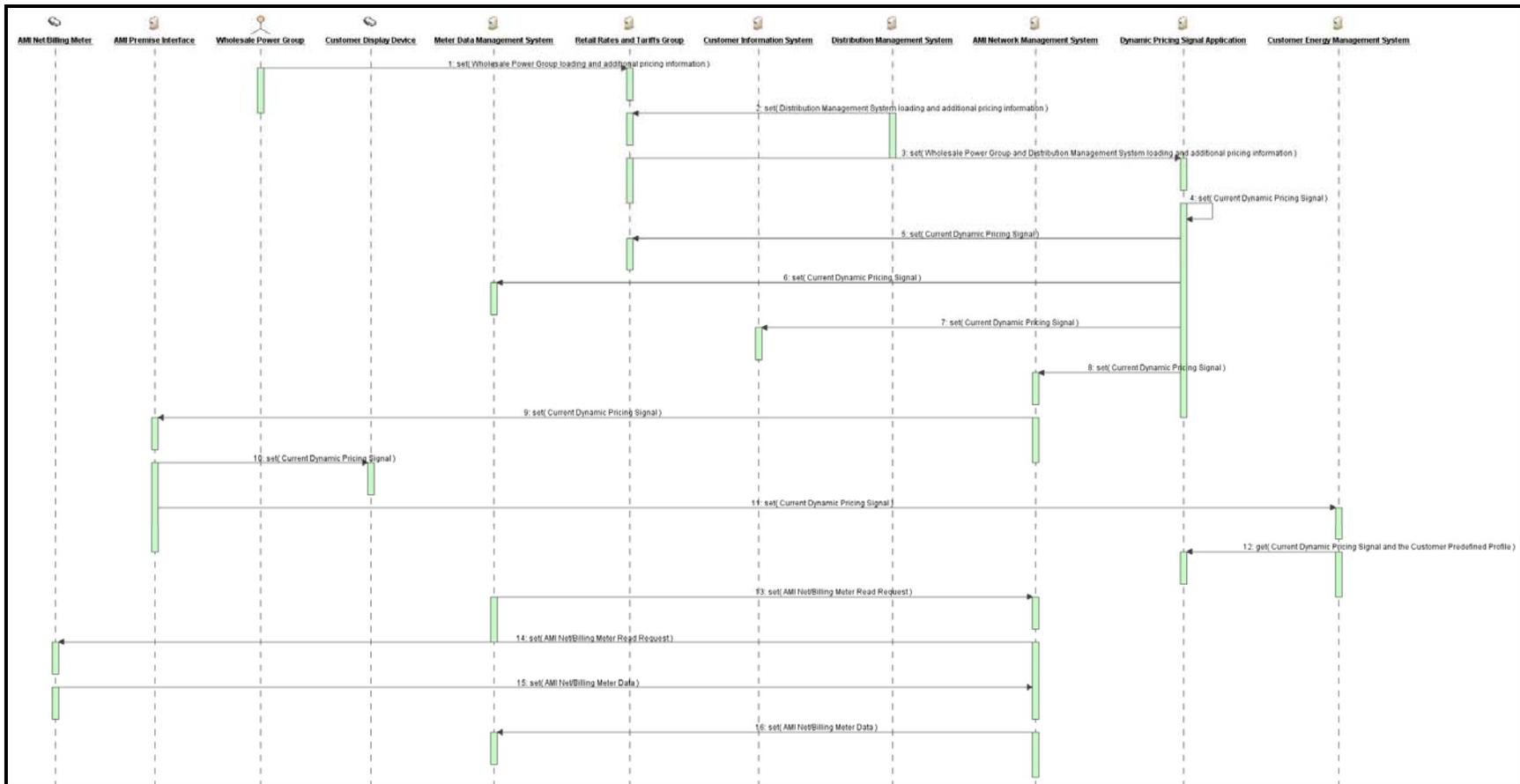
<i>Actor/Activity</i>	<i>Post-conditions Description and Results</i>
Customer	Customer has researched their Predefined Profile settings and has programmed them into their Customer Energy Management System to allow their DG System act accordingly to benefit their costs/payback.
The Utility	The Utility can call an event and have the Customer respond accordingly.
The Utility	The Utility can call an event and measure the actual amount of load that was affected.

2.3 Architectural Issues in Interactions

Elaborate on all architectural issues in each of the steps outlined in each of the sequences above. Reference the Step by number..

2.4 Diagram

For clarification, draw (by hand, by Power Point, by UML diagram) the interactions, identifying the Steps where possible.



Use Case 3 Scenario 1 Sequence Diagram

3 Auxiliary Issues

3.1 References and contacts

Documents and individuals or organizations used as background to the function described; other functions referenced by this function, or acting as “sub” functions; or other documentation that clarifies the requirements or activities described. All prior work (intellectual property of the company or individual) or proprietary (non-publicly available) work must be so noted.

FUTURE USE

ID	Title or contact	Reference or contact information
[1]	ANSI C84.1-1995 Electrical Power Systems and Equipment – Voltage Ratings (60HZ)	ANSI A and ANSI B Voltage Requirements
[2]		

3.2 Action Item List

As the function is developed, identify issues that still need clarification, resolution, or other notice taken of them. This can act as an Action Item list.

FUTURE USE

ID	Description	Status
[1]		
[2]		

3.3 Revision History

For reference and tracking purposes, indicate who worked on describing this function, and what aspect they undertook.

FUTURE USE

No	Date	Author	Description
1.1	8-11-09	Brian D. Green	Draft for Review
1.2	8-13-09	Brian D. Green	Update Equipment Interfaces
1.3	9-21-09	Brian D. Green	Change to new template
1.4	9-23-09	Brian D. Green	Identify missing Information Objects, remove unnecessary steps and re-number.
1.6	9-28-09	Ronald J. Pasquarelli	Updates for import into IKB.
1.7	9-29-09	Ronald J. Pasquarelli	Remove old sequence diagrams
1.8	10-2-09	Ronald J. Pasquarelli	Cleanup- add actor the Utility, remove policy
1.9	10-06-09	Brian D. Green	Cleanup – Actors
1.10	12-01-09	Brian D. Green	Change actor name from Retail Rates and Tariffs Group to Price Origination Group
1.11	12-15-09	Brian D. Green	Make the document generic and ready for posting on EPRI’s Smart Grid Use Case Repository.

3.4 Common Terms and Definitions

As the function is developed, identify issues that still need clarification, resolution, or other notice taken of them. This can act as an Action Item list.

ID	Term	Definition
[1]	Feeder Penetration	<p>PV penetration is the rated capacity (KW) of the aggregated generation, including the proposed Generating Facility compared to the annual peak load (KW) as most recently measured at the substation or calculated for that portion of a public utility's electric system connected to a Customer bounded by automatic sectionalizing devices or the end of the distribution line.</p> <p>Units are % of peak on the feeder or portion of a public utility's electric system</p> <p>In Manuel's discussions with the state, "DG will be viewed by the rating of devices at point of common coupling."</p>
[2]	Advanced Metering Infrastructure (AMI)	<p>"AMI" for the Utility for this project- refers to systems that measure, collect and analyze energy usage, and send information to the Customer through advanced electricity meters, via various communication media on request or on a pre-defined schedule. This infrastructure includes advanced electrical meters, communications, and meter (MDM) software. The communication between the end use energy consumer and the utility is two way communications. The AMI infrastructure and communications for the purposes of this project ends at the meter, which provides a Premise Interface to the Inverter or possibly the Home Area Network.</p>
[3]	AMI Premise Interface	<p>The Premise Interface is one of the communications radios "under glass" of the AMI Meter. (There are two radios built in to the AMI Meter. One is for the AMI System and is a longer range radio. The other is for the Premise Interface and it has a smaller range.) This interfaces to the Customer Inverter and the Home Area Network (if available).</p>

[4]	Home Area Network	Any Customer side automation that can make use of utility signals to affect energy usage within the premises will be considered as the Home Area Network for this project. Home Area Network can affect DER, lighting, security, etc. The Utility will not own Home Area Network.
[5]	Smart Grid	The Utility's perspective is that the "smart grid" is a grid that integrates the electrical grid with communications/ automation with a fully integrated IT infrastructure to enhance reliability, involve the consumer, and integrate distributed resources. It is the seamless integration of the electric network, a communications network, and all the necessary software and hardware to monitor, control and manage the creation, distribution, storage and consumption of energy by any Customer type. The smart grid of the future needs to be interactive, distributed, and extended to any consuming device.
[6]	Real Time Pricing (RTP) Model	An electricity pricing methodology that enables automatic Customer load response based on a pre-defined price matrix in response to a utility signal for hourly pricing.
[7]	Distributed Generation (DG) and Distributed Energy Resource (DER)	For this project Distributed Generation (DG) will be defined as utility or Customer provided photovoltaic generation or storage connected at the distribution voltage level (12.47kV) or service voltage level. Distributed Energy Resources (DER) on the other hand will include all DG and demand response capability through the Home Area Network.
[8]	Electrical Storage	The definition for storage for this project will be considered electrical storage (providing a way to add electrons to the grid). Alternate Scenario (and UC-3 – Demand Response): The definition for storage for this project will be electrical storage along with thermal storage (building envelop/thermal storage) and demand response techniques aligned with

		commercial and residential cooling and refrigeration systems in addition to innovative approaches to demand response aligned with data center energy consumption.
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